

General Aviation EPIREP System

***Honeywell International (NavRadio Corp.)
AWIN Topical Project Overview***

May 23, 2000

EPIREP PROJECT OVERVIEW

OVERALL PROJECT OBJECTIVES:

- “To create a viable means of gathering EPIREP data from G-A and Regional aircraft for near-term research and for practical deployment within the next few years.”
- “Create a solution to the problem of ...lack of suitable airborne environmental instrumentation and datalink equipment”

KEY TECHNICAL ELEMENTS

- **Aircraft Instrumentation Package**
- **Airborne Datalink Transmitter Subsystem**
- **Ground Datalink Reception Subsystem**
- **Ground Data Collection / Processing**

EPIREP SIGNIFICANCE

- **Improved “Nowcasting” for GA, Other Aircraft**
- **Improved Weather Forecasts/Models for Aviation**
- **Improved Weather Forecasts/Models for Non-Aviation**
- **Additional Utility for FIS Equipment**
- **Potential Regulatory Benefits**
- **Pilot Icing Indicator Product**

EPIREP PROJECT TEAM

- **Honeywell (NavRadio Corp.)**
- **Optical Detection Systems (ODS)**
- **Experimental Aircraft Association**
- **NCAR**

SENSOR PACKAGE CONCEPT

EXTERNAL SENSORS

- **Airspeed Inlet**
- **Icing Gap Detector**
- **Air Temperature**
- **Relative Humidity**
- **Static Port**

INBOARD SENSORS

- **Airspeed Pressure**
- **Icing Processor**
- **Signal Conditioning**
- **Pressure Altitude**
- **Heading**
- **Vertical Acceleration**

EPIREP Phase I Probe Design



NOTABLE ACCOMPLISHMENTS

- **System Design, Prototypes**
- **Airborne VDL Transmitter design/prototype**
- **Ground VDL Receiver design/prototype**
- **First Prototype System Completed**

EPIREP PROTOTYPE

EPIREP System



EPIREP Air Data Probe

- Revolutionary Ice Detection – senses 1/32" and 1/8" thickness and rate
- Can sense inflight precipitation
- Airspeed
- Static sensors – altitude and vertical speed
- Automatically heated for ice removal
- Total air temperature, humidity, and calculated Dewpoint
- Ice detection can be shown directly in cockpit
- Precision machined 6061 Aluminum with hard galvanized finish
- Zero – drag airfoil design – mount on wing or fuselage

Inertia Technology, Franktown, CO 80134 (877) 40-INERT

Ice Detection available in standalone configuration.



Inertia Technology
EPIREP Air Data Controller

s/n 99-0002 mfd 7-17-99
Inertia Technology
Franktown CO 80136 (303) 814-3105

EPIREP Air Data Controller

- Air Data and Ice Detection components
- Hall-effect Magnetic direction
- Vertical accelerometer (turbulence detection)
- Pitot and Static IC circuits
- Ice Detection Microcomputer
- Works with 12-28 volt systems

Inertia Technology, Franktown, CO 80134 (877) 40-INERT

Ice Detection available in standalone configuration.

- Will be available for all aircraft
- Total system weight of <2 lbs
- Utilizes high/low digital radio system
 - True Airspeed
 - Altitude

- GPS position and Magnetic heading
- Airframe Temperature and Dewpoint

- Revolutionary inflight Ice Detection system – Patented technology and Patents Pending

7-26-99

NOTABLE ACCOMPLISHMENTS

- **First Aircraft Installation Completed**
- **Validated Ease of Installation - 1/2 Day (Experimental Aircraft)**
- **First Flights Completed**
- **Validated G-A size, weight viability**

EPIREP PROBE INSTALLATION



EPIREP TEST AIRCRAFT



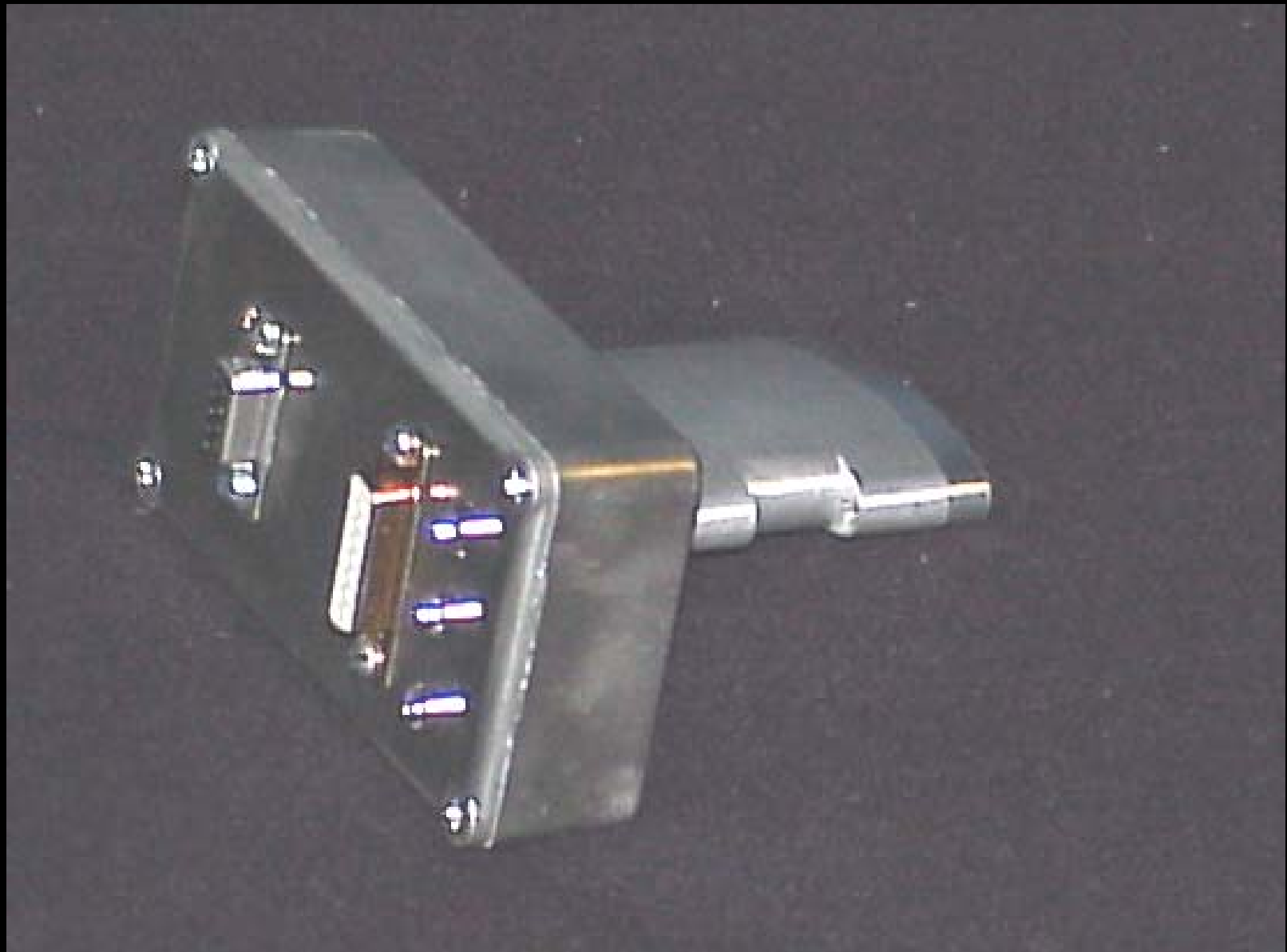
NOTABLE ACCOMPLISHMENTS

- **Phase I Production Design Completed**
- **Phase I Equipment Production completed**
- **Phase I Production Probe Initial Wind Tunnel Tests**

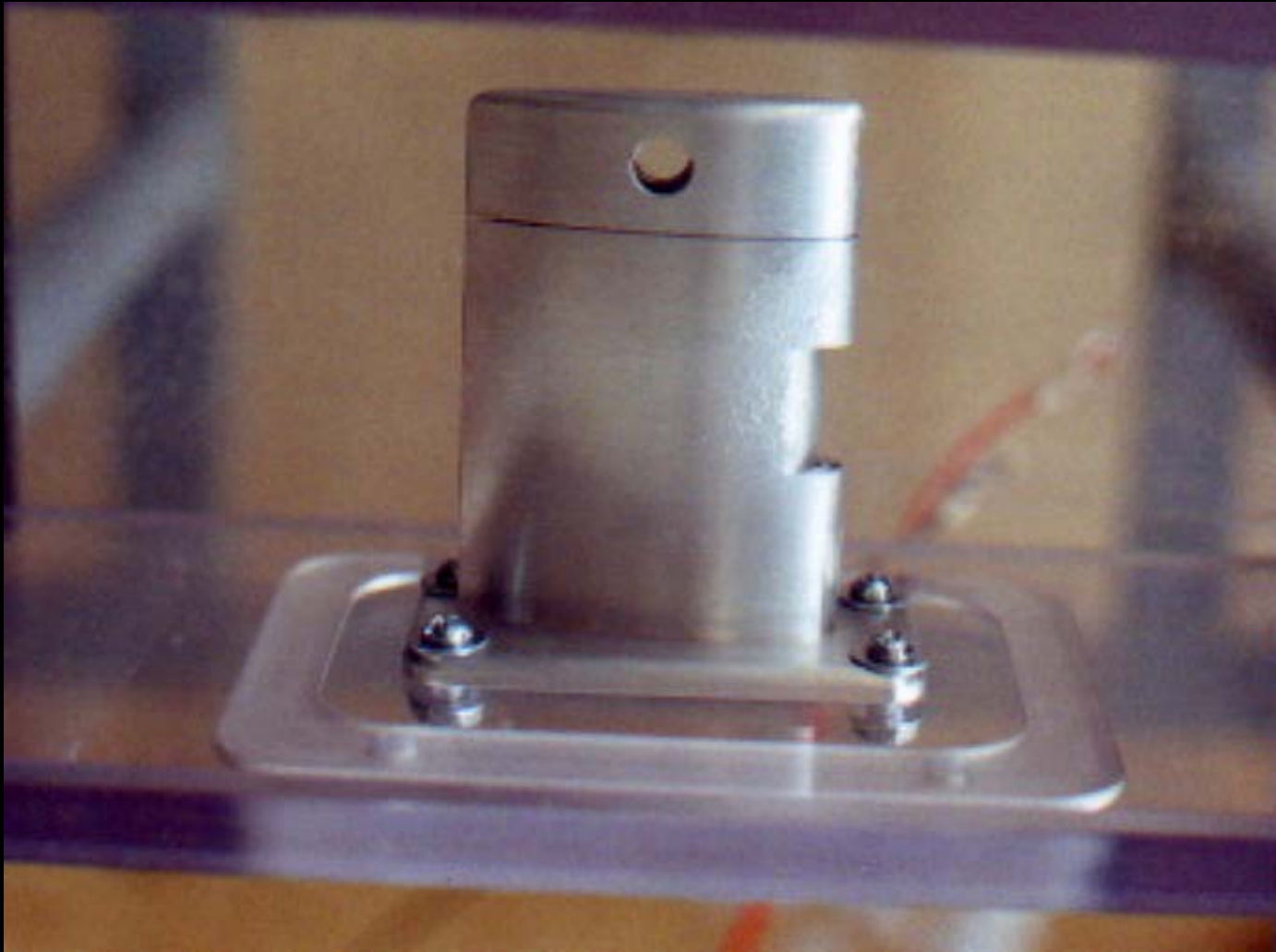
PRODUCTION PHASE I EPIREP PROBE



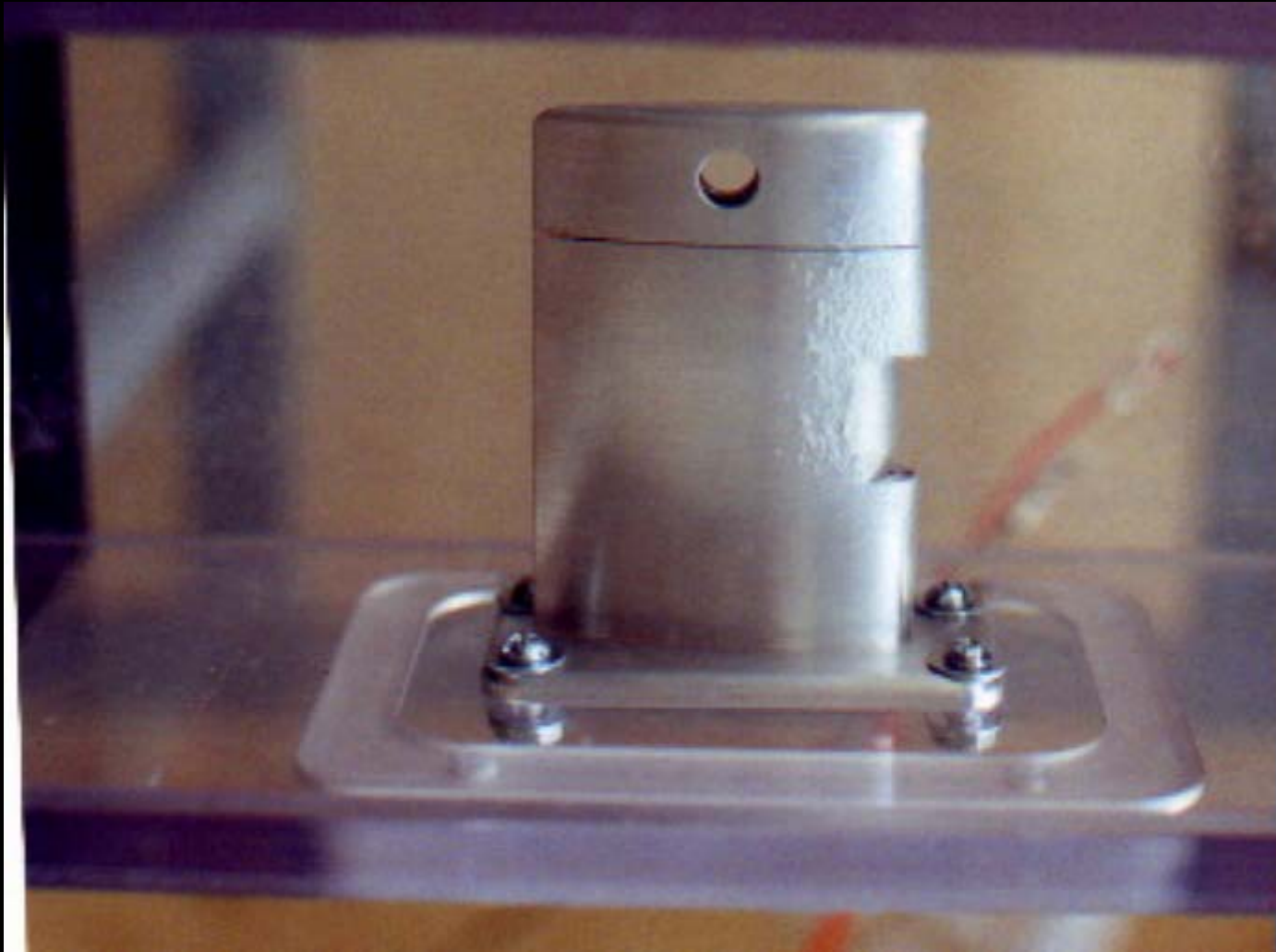
PRODUCTION PHASE I EPIREP PROBE



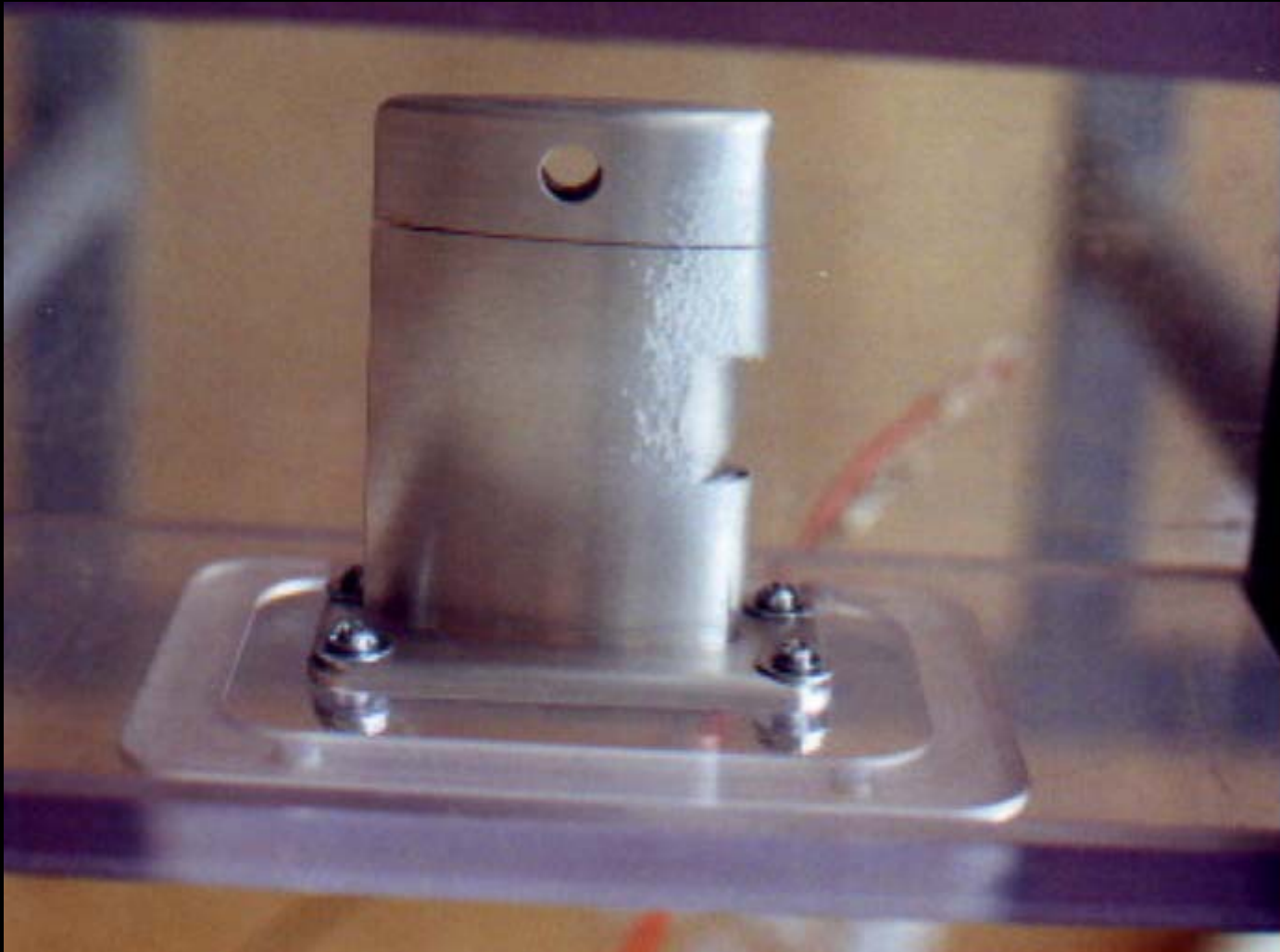
WIND TUNNEL TEST - TRACE ICING



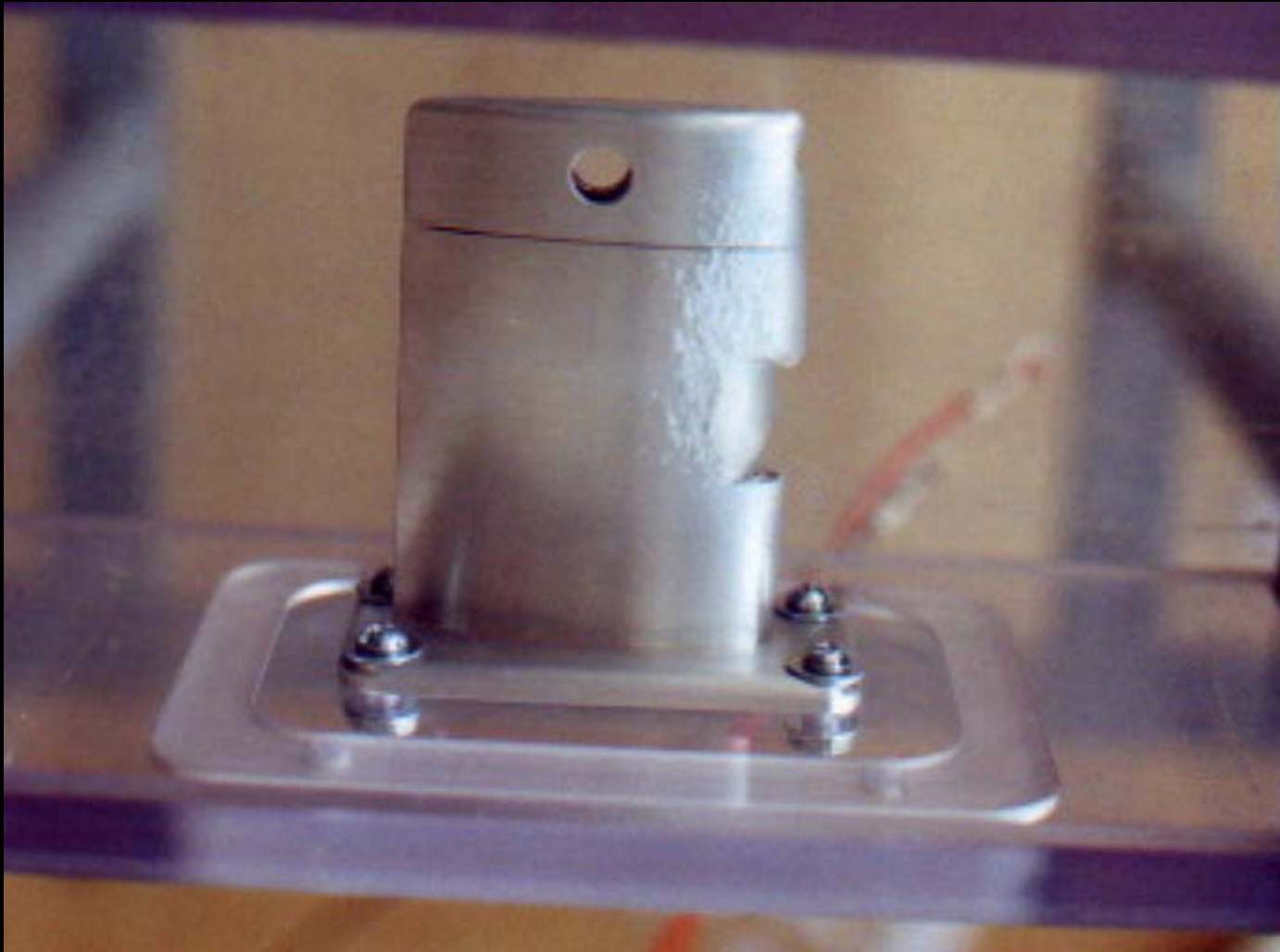
WIND TUNNEL TEST - MODERATE ICING



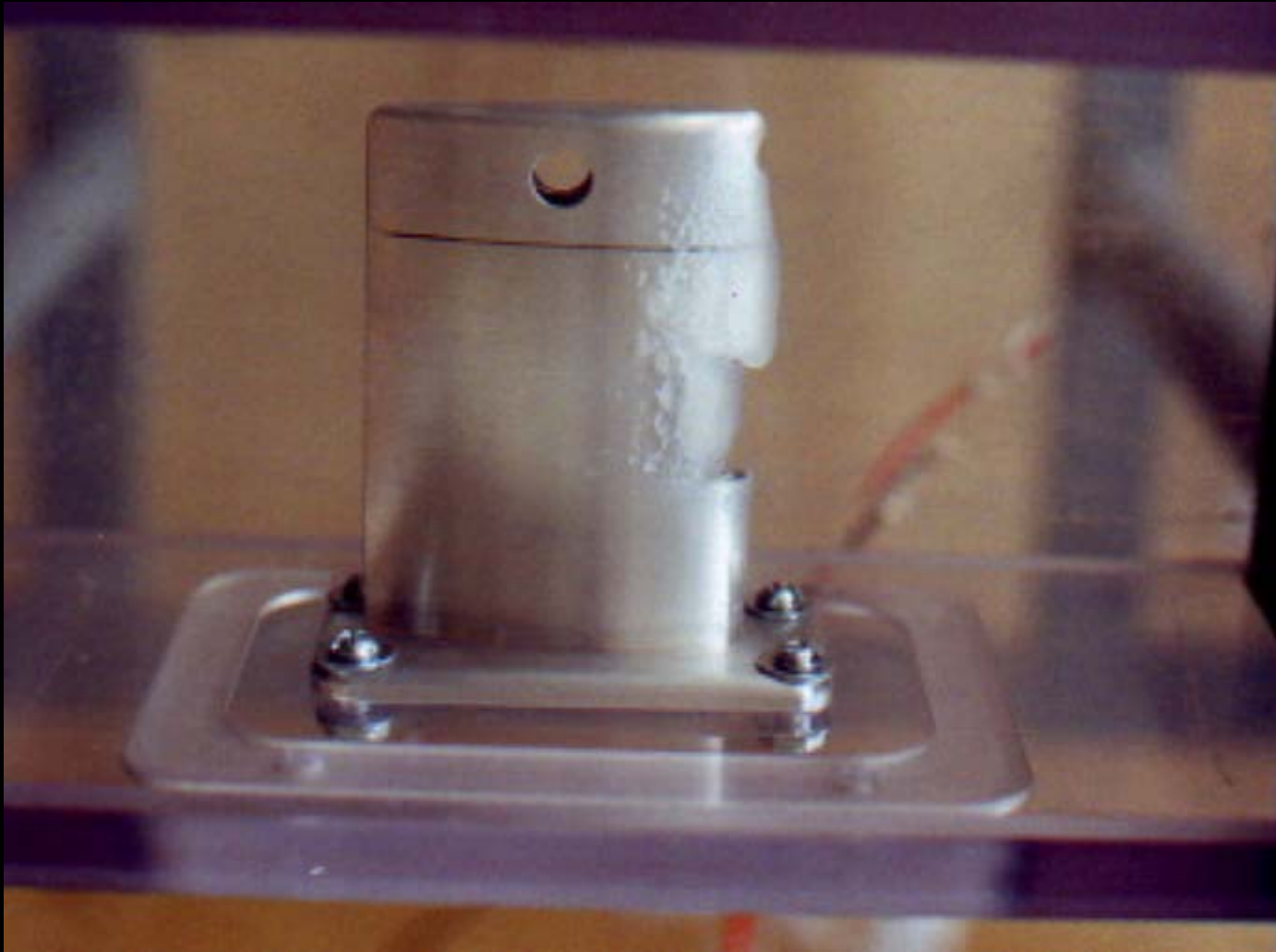
WIND TUNNEL TEST - HEAVY ICING



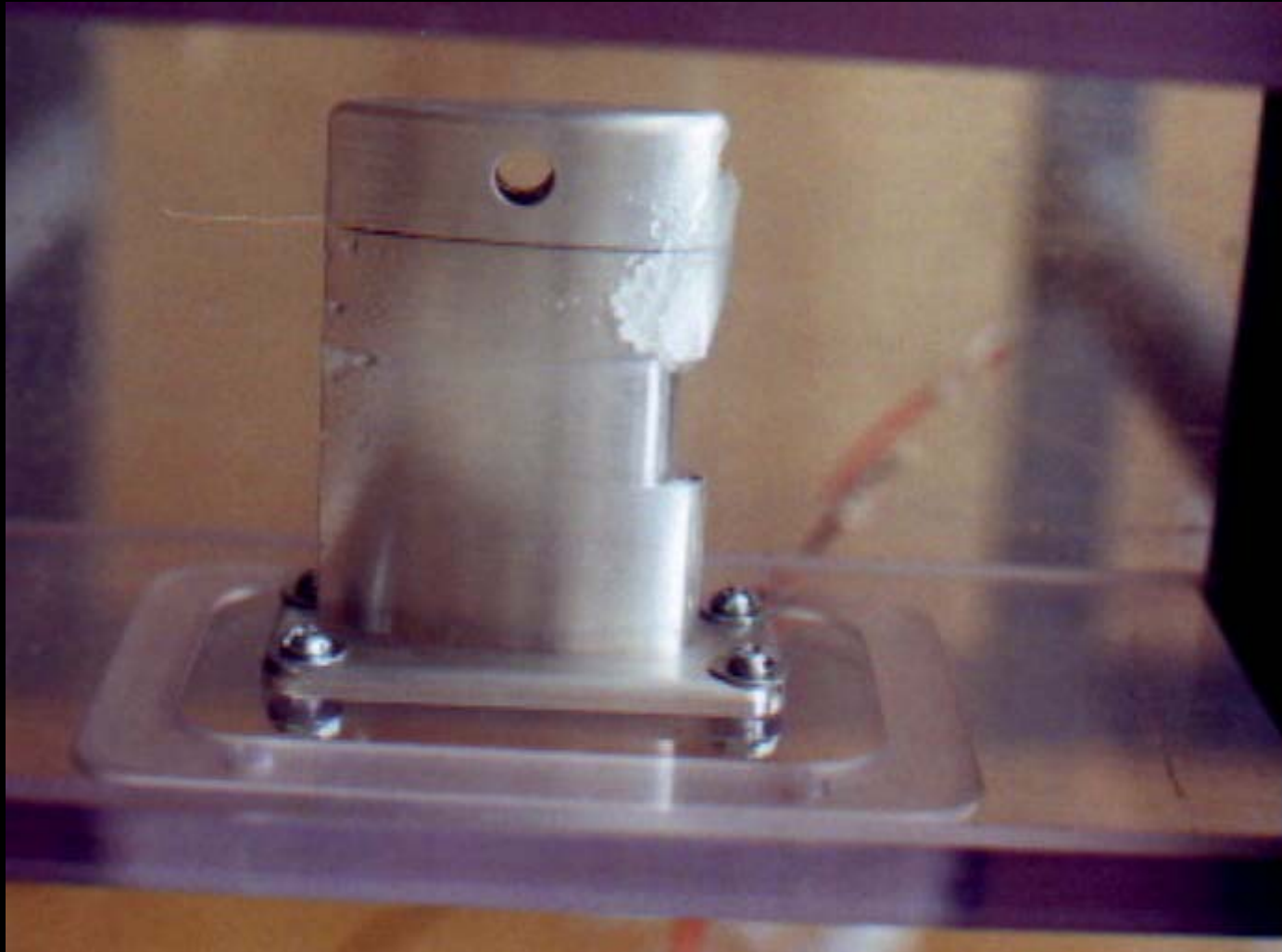
WIND TUNNEL TEST - SEVERE ICING



WIND TUNNEL TEST - DEICE CYCLE BEGINS



WIND TUNNEL TEST - DEICE CYCLE COMPLETE



NOTABLE ACCOMPLISHMENTS

- **Icing Detection Subsystem Flight Testbed Installation**
- **BE200 Operated by University of Wyoming Atmospheric Sciences**
- **First Flights Completed**
- **Validated Icing Instrument vs. LWC/Temperature and Comparative Instrumentation**
- **Baseline wind tunnel testing**







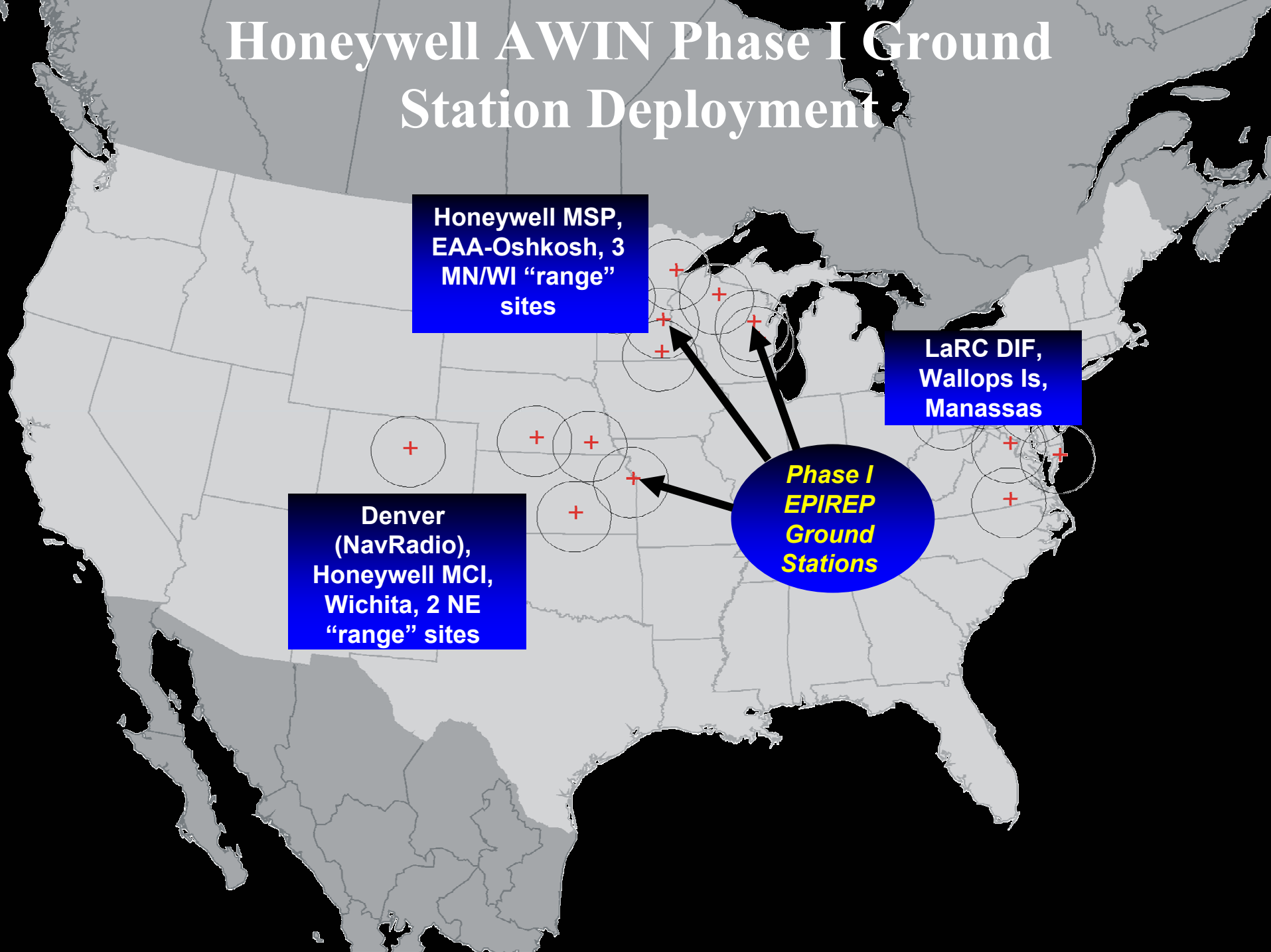
Honeywell AWIN Phase I Ground Station Deployment

Honeywell MSP,
EAA-Oshkosh, 3
MN/WI "range"
sites

LaRC DIF,
Wallops Is,
Manassas

Denver
(NavRadio),
Honeywell MCI,
Wichita, 2 NE
"range" sites

*Phase I
EPIREP
Ground
Stations*



G-A AWIN EPIREP Phase II

- **Flight Tests/Data Collection using Phase I Equipment**
- **Advanced Wind Tunnel and Bench Testing**
- **Calibration and Design Refinements as Needed**
- **337 or Single-aircraft STC on 1 aircraft**
- **STC of stand-alone ice subsystem**

G-A AWIN EPIREP Phase II

- **High-usage system operations/data collection**
- **Weather Analysis/Forecast Improvement Analysis**
- **EPIREPs practical deployment business model**
- **Version 2 DCP Study/Development**

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